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# Didactic bases of teaching "Physics of atomic and nuclear structure" in continuous physics education

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**Abstract.** The development of atomic and nuclear physics, the efficient use of nuclear energy plays an important role in the international arena. The structure of the atom and the nucleus, the training of internationally advanced personnel to improve the use of its energy is a topical issue today. The role of atomic and nuclear physics in education, science and industry in our country is wide. However, taking into account the fact that the introduction of modern and new areas of nuclear physics, such as radiation physics, deformed nucleus physics, into the system of continuing education will further increase the efficiency of specialists trained in this field.

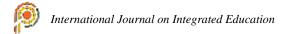
Keywords- nuclear energy, modern theoretical nuclear physics, physics teaching methods

#### I. INTRODUCTION

In the development of the world education system, the development of atomic and nuclear physics, the use of nuclear energy and the training of modern specialists in this field are an important part of global growth. In-depth study of physics in the education system of developed countries, improving the use of nuclear energy in social energy consumption, the implementation of a differentiated approach to the use of technology in education, training in accordance with international standards remain one of today's urgent tasks. The world community pays special attention to research work related to the expansion of students' scientific outlook, development of creativity, application in practice through the organization of in-depth special training courses in physics. Given the demand and need for teaching physics in the global education system today, teaching atomic and nuclear physics in the current areas of modern physics is one of the purposeful research work. In the framework of such comprehensive reforms as ensuring the effective integration of education, science and industry, strengthening the material and technical and information base of educational institutions, providing high quality textbooks, opportunities for teaching physics in modern education on the basis of modern educational technologies and innovative approaches.

### II. THEORITICAL BACKGROUND

At the same time, improving the effectiveness of teaching physics in continuing education plays a very important role. The first priority in the Progression strategy for the further development of the Republic of Uzbekistan is "in-depth teaching of important and in-demand subjects such as physics, computer science, mathematics". It is important to systematize a set of teaching methods, tools and pedagogical methods, as well as to create new types of textbooks. Decree of the President of the Republic of Uzbekistan No. PF-4947 of February 7, 2017 "On the Strategy for further development of the Republic



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of Uzbekistan" and March 14, 2017 No. PF-4947 of February 7, 2017 "On the Progression Strategy for further development of the Republic of Uzbekistan" The Decree emphasizes this area.

#### III. LITERATURE REVIEW

Improving the effectiveness of teaching physics in the country, the creation of STS, curricula, educational experiments, educational literature:B.Mirzahmedov, Q.T.Olimov, E.N.Nazirov, P.Q.Habibullaev, O.Akhmadjonov, A.Boydadaev, M.Choraev, Y.G.Mahmudov,Sh.M.Kamolkhojaev, E.O.Turdikulov, D.Shodiev, S.Qahhorov, M. X.Olmasova, Y.Pulatov, M.Kurbanov, A.G.Ganiev, A.Nomonkhodjaev, K.A.Tursunmetov; applied bases of pedagogical technologies: UK.Tolipov, J.O.Tolipova, M.Usmonbaeva; The introduction of computerization of education and information technology in the educational process was studied by AA Abdukadirov, U. Begimkulov, U. Yuldashev, M. Aripov, M. Ziyokhojaev, A. Khaitov.

Demonstration experiments in physics, frontal laboratory work, demonstration of problem experiments in secondary schools of the Commonwealth of Independent States: M.N. Shakhmaev, L.I. Antsiferov,

B.B.Mayer, A.A.Pokrovsky, Improving the effectiveness of teaching physics for academic lyceums and professional colleges, active and intensive teaching M.N.Zvereva, V.I.Lerner, R.I.Malafeev, P.I.Medvetsky, MMTerentev and others.

The basis of this research is the content of teaching the course "Improvement of Atomic and Nuclear Physics" in educational institutions with in-depth study of physics, methods, techniques and tools for further improvement of this course.

#### IV. MAIN PART

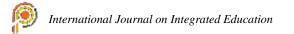
Methodological approaches to the pedagogical preparatory stages of in-depth teaching of atomic and nuclear physics, aimed at creative thinking of students, the formation of general worldviews in science, the integration of science and profession, the integration of natural and virtual forms of practice It is recommended to use ITC effectively in the learning process, systematized based on the capabilities of students.

It is necessary to develop methodological guidelines and recommendations for its implementation in the special curriculum of the special course "Improved teaching of atomic and nuclear physics" in academic lyceums with in-depth study of physics. It is important to develop and recommend a textbook entitled "Improved teaching of atomic and nuclear physics", which covers the full curriculum of the special course. Electronic demonstrations, slides, animations are created and recommended for the learning process.

As a result of the research, the current direction of modern physics is explained by the development of a program for a special course "Improved teaching of atomic and nuclear physics", the creation of a textbook and the improvement of the content and technological basis of teaching methods. This special course serves to provide competitive professionals in various fields of energy, aware of scientific and technical achievements.

In the system of academic lyceums, the teaching of special courses has a special significance in the process of training specialists.

Today, each branch of nuclear physics is being studied and developed as an independent science with branches. These include nuclear models, nuclear reactions, the interaction of radioactivity and



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nuclear radiation with matter, nuclear electronics, nuclear energy, heavy ion physics and the synthesis of very heavy elements, cosmic ray physics, elementary particles and their structure, and dozens of other fields.

Phenomenological and microscopic models of the nucleus are used to study the properties of spherical or deformed nuclei composed of strongly interacting neutrons and protons.

The construction of heavy ion accelerators opened a new era in the field of nuclear reactions. Today, the physics of heavy ions, nuclear reactions with heavy ions, and the artificial synthesis of heavy elements that do not exist in nature are developing rapidly.

Solar energy, which is the main energy on Earth, occurs as a result of thermonuclear reactions that take place in the sun.

The study of the laws of the structure of the nucleus and the forces of the nucleus is also important in the science of astrophysics.

The most important task before modern theoretical nuclear physics is to create a complete theory of nuclear forces.

With this in mind, the creation of special courses on current areas of modern physics remains a key issue in the training of specialists who can meet modern requirements. According to the content and essence of the first special courses can be divided into:

"Semiconductors and their applications", "Conductivity physics and its practical significance", "Light fiber optics and its practical significance" and others. The teaching of the special course also includes the creation of visual aids, including electronic textbooks, electronic slides, multimedia electronic manuals, videos and virtual and real laboratory work for practical training. Therefore, the choice of an effective method of the educational process is followed by an improved method of teaching.

## **CONCLUSION**

Thus, the research work carried out in the field and the analysis of educational literature, textbooks, manuals show that there is a need to create special courses in physics.

Based on the analysis of the literature and research and the "Concept of creating a new generation of textbooks for higher and secondary special, vocational education," it was found expedient to create curricula and programs for the preparation of modern textbooks.

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